

CHAPTER 4. WATER AND RELATED RESOURCES PROBLEM AND OPPORTUNITIES

This chapter discusses identified water and related resources problems and opportunities based on the without-project conditions described in **Chapter 3**. The SRWRS will formulate solutions for the identified problems; these solutions could contribute to the identified opportunities, resulting in potential ancillary benefits.

The following are identified problems and opportunities (described in detail below):

- Water supply reliability in the Placer-Sacramento region (Problem)
- Enhancement of CVP operational flexibility (Opportunity)
- Promotion of ecosystem preservation in the lower American River (Opportunity)
- Coordination with ABFSHIP for regional benefits (Opportunity)

Opportunities to promote Delta ecosystem restoration may exist by shifting a number of future American River diversions to an alternate location; however, such opportunities may depend on other factors such as SWP actions, lower Sacramento River diversions, EWA operations, and other ongoing projects and programs. Therefore, this benefit is not identified as an opportunity in the SRWRS.

WATER SUPPLY RELIABILITY IN THE PLACER-SACRAMENTO REGION (PROBLEM)

Conjunctive use is the strategy in the WFA for long-term water supply reliability. This strategy includes allowing water purveyors to divert surface water according to their surface water rights and contract entitlements in wet years, and in dry years, reduce their surface diversions, increase use of groundwater and other supplemental water, and/or provide supplemental instream flow through storage release.

Challenges in Implementing Conjunctive Management

While the above programmatic concept for long-term water supply reliability has been accepted, individual water supply facility planning and construction are subject to project-specific evaluation and approval. Therefore, the problem of water supply reliability in the Placer-Sacramento region continues mainly because of lack of major infrastructure for implementing the programmatic concept and groundwater contamination. With recent expansion of the Sacramento Fairbairn and Sacramento River WTPs, construction of the PCWA ARPS, and completion of the Freeport Regional Water Project environmental review process, the SRWRS is the only remaining major infrastructure plan to be completed for realizing the goals envisioned by the WFA of surface water development and conjunctive use management.

The intensified threat of groundwater contamination in the region (described in **Chapter 3**) has raised concerns about loss of perceived groundwater availability in this region to support planned development and facilitate conjunctive management. Production wells have been shut down due to groundwater contamination from Aerojet, and groundwater supply could be further impacted because the perchlorate contamination is not contained and its migration pattern and extent are currently undefined.

The WFA anticipates that groundwater supply would not be affected by contamination, assuming all contamination would be under control and remediated. However, recent unexpected migration of the Aerojet perchlorate plume across the American River indicates otherwise. The lack of understanding of the

migration pattern and extent of perchlorate further concerns water purveyors relying solely or largely on groundwater for their water supply.

As a result, local water purveyors are seeking greater regional collaboration to improve planning and operational efficiency, diversify sources of water, and expand infrastructure interconnection and redundancy to ensure long-term water supply reliability. Purveyors with surface water rights and contract entitlements plan to use their available surface water consistent with their Water Forum commitments to environmental preservation, and to further reduce their reliance on groundwater. Others without surface water rights and contract entitlements sought collaboration from holders of water rights and contract entitlements to diversify their portfolio of water sources without violating WFA principles. For example, purveyors in the Sacramento POU are seeking opportunities for Sacramento to provide surface water to their service areas to take advantage of Sacramento's available surface water rights.

Potential Deficiency in Water Supply Reliability

Potential deficiencies in water supply reliability for SRWRS cost-sharing partners are summarized in **Table 4-1**. The projection is based on a preliminary modeling simulation, which is subject to revision as the study progresses. Results show that WFA limitations on diversions from the American River would become a limiting factor for water supply in the Placer-Sacramento area under the assumed conditions, and implementation of water management measures in each cost-sharing partner's WFA PSA.

PCWA and Roseville would have deficiencies of up to about 34,500 and 5,000 AF per year, respectively, in all Water Forum year-types. For SSWD, surface water is a source of water supplemental to its groundwater resources and thus, no projected water supply deficiency would exist. However, with the threat of reduced groundwater availability due to contamination, reduced application of surface water entitlements could affect the long-term regional water supply reliability for this agency.

The quantity of potential deficiency for Sacramento is not easily defined because its WFA limitations on diversions from the American River are flow-based. The potential deficiency would be affected by hydrologic conditions in the American River basin and the operation of Folsom Dam by Reclamation. The Below Hodge Conditions may become a controlling factor even in wet and average years. A preliminary assessment indicates that the Hodge Condition could occur in about 50 percent of wet and average years, causing depiction of potential water supply deficiency to be inaccurate if summarized by Water Forum year-type; thus, an average of all years is used. Preliminary monthly modeling results suggest an average deficiency of 17,000 AF per year in surface water supply; however, this may have been underestimated because the deficiency in facility capacity could be a greater control factor for Sacramento's real-time operation for water supply.

Table 4-2 compares max-day demand and total available (or allowable) capacity at the Fairbairn and Sacramento River WTPs. The significant deficiency in facility capacity would result in increased reliance on groundwater use and limited ability to assist neighboring purveyors who rely solely or heavily on groundwater; both would negatively affect conjunctive management and thus, long-term water supply reliability in the Placer-Sacramento region.

ENHANCEMENT OF CVP OPERATIONAL FLEXIBILITY (OPPORTUNITY)

The opportunity to enhance CVP operational flexibility could occur through implementation of WFA elements, which would result in reducing future diversions from the lower American River and supplementing dry-year inflows to Folsom Lake with upstream storage releases. The SRWRS could contribute to realizing these management actions, as well as to the highly related opportunity for promoting ecosystem preservation in the lower American (discussed in more detail below).

Table 4-1. Potential Future Water Supply Deficiency for PCWA, SSWD, and Roseville

Water Forum Year-Type ^[1]	Water Purveyor	Type of Use	Demand (AF per year)	Supply (AF per year)			Unmet Demand (AF per year)
				Surface Water ^[2]	Groundwater	Others ^[3]	
Wet Years	PCWA	Ag	140,000	85,000	51,000	4,000	0
		M&I	85,400 ^[2]	50,900	0	0	34,500 ^[4]
	SSWD	M&I	92,227	55,064	37,163	0	0
		M&I	64,020	58,900	0	2,773	2,347
Driest Years	PCWA	Ag	140,000	57,892	66,000	4,000	12,108 ^[5]
		M&I	85,400 ^[2]	50,900	0	0	34,500 ^[4]
	SSWD	M&I	92,227	3,500	88,727	0	0
		M&I	64,020	39,800	7,300	11,993	4,927

^[1] Projection for wet and driest years only bracket the water supply conditions because the corresponding limitations on diversions from the American River for these purveyors are Water Forum year-type dependent.

^[2] Surface water supply is limited by WFA when diverted from the American River. Surface water allocation was based on monthly results from a preliminary CALSIM modeling study, which is subject to further refinements as the study progresses.

^[3] For PCWA, reclaimed water; for Roseville, reclaimed water and extra ordinary conservation.

^[4] Demand and unmet amounts are based on a slow-growth projection. A future realized growth greater than the assumed slow-growth projection would result in additional unmet demand.

^[5] Agricultural deficiency in areas without groundwater accessibility.

Table 4-2. Projected Future Water Supply Deficiency for Sacramento

(a) in Annual Average Volume

Water Forum Year-Type	Water Purveyor	Type of Use	Demand (AF per year)	Supply (AF per year)			Unmet Demand (AF per year)
				Surface Water ^[1]	Groundwater	Others ^[2]	
All Years ^[3]	Sacramento	M&I	239,804	222,804 ^[3]	7,136	0	17,000

^[1] Surface water supply is limited by WFA when diverted from the American River. Surface water allocation was based on monthly results from a preliminary CALSIM modeling study, which is subject to further refinements as the study progresses.

^[2] For Sacramento, no currently approved use exists for other sources of water.

^[3] Projection represents the average of all year-types because the corresponding limitations on diversions from the American River for Sacramento are flow-dependent. The Hodge conditions, defined in Table 3-7 for triggering the diversion limitations from the American River, could occur in all year-types.

(b) in Max-Day Capacity

Water Forum Year-Type	Hydrologic Condition	Type of Use	Surface Water Demand (AF per year)	Capacity Needs (mgd)			Available Max-Day Supply ^[2] (mgd)	Unmet Max-Day Demand (mgd)
				Max-Day Demand	Wheeling for Sacramento County ^[1]	Total		
Driest Years	All	M&I	232,668	378	23	401	260	141
All Other Years	Above Hodge ^[3]	M&I	232,668	378	23	401	360	41
	Below Hodge ^[4]	M&I	232,668	378	23	401	260	141

^[1] Wheeling for Zone 40 and Zone 50.

^[2] The installed capacity of the Sacramento River WTP is 160 mgd, and that of the Fairbairn WTP is 200 mgd. The diversion rate at the Fairbairn WTP is subject to limitations in the WFA.

^[3] Above Hodge: The American River flow is above the flow thresholds set forth by the Hodge decision. (See Table 3-7 for definition.)

^[4] Below Hodge: The American River flow is below the flow thresholds set forth by the Hodge decision. (See Table 3-7 for definition.)

As an integral part of the CVP, Folsom Dam is operated for contract deliveries, flood management, instream flow needs in the lower American River, and water quality needs in the Delta. The operation of Folsom Dam is especially critical in meeting Delta water quality objectives in D-1641, which requires that the CVP and SWP meet Delta water quality flow objectives (except for salinity objectives in the south Delta) until a settlement is reached with other Sacramento Valley water right holders. Since Folsom Reservoir is the closest water source to the Delta, releases from Folsom Dam often are used first to maintain Delta water quality standards when Delta conditions deteriorate. A release is reduced once standards are met or increased flows from other reservoirs arrive in the Delta.

This existing operational flexibility provided by Folsom Reservoir for D-1641 compliance would be further affected by increasing needs for water supply, flood control, and fishery management in the American River. The increased demand in the American River basin (especially in the upper basin) would reduce available water to the CVP for water supply purposes and flow management in the lower American River and in the Delta. The recently completed OCAP BO by NOAA Fisheries indicates that the ability to fill Folsom Reservoir in May would be reduced from 50 percent to 40 percent between conditions today and conditions in the future as water demand in the American River basin increases from a total of 256 thousand acre-feet (TAF) at the 2001 level of development (LOD) to 688 TAF at a 2020 LOD. Since 1996, Reclamation implemented a dynamic allocation of flood control space from 400,000 to 670,000 AF based on SAFCA's recommendation; this action also may result in less storage in some hydrologic conditions such as that of 1997. Increasing needs for additional instream flow requirements and other fishery management goals in the American River would also compete for limited water and storage behind Folsom Dam, as explained in the following opportunity for promoting ecosystem preservation in the lower American River.

PROMOTION OF ECOSYSTEM PRESERVATION IN THE LOWER AMERICAN RIVER (OPPORTUNITY)

The opportunity to promote ecosystem preservation in the lower American River could come from implementing projects contributing to the water supply reliability objective of the WFA and thus, facilitate progress in the other Water Forum co-equal objective of preserving the lower American River. This opportunity may accompany the opportunity for enhancing CVP operational efficiency, as described above.

Lower American River instream flow requirements were originally defined in SWRCB D-893. The SWRCB then increased the D-893 minimum release schedule through D-1400. This decision was applied to the water rights permit for Auburn Dam and does not apply to operation of Folsom and Nimbus dams. However, Reclamation voluntarily operates Folsom and Nimbus dams to meet a modified D-1400 for minimum fishery flows, and more recently has striven to meet recommended AFRP flows for the lower American River under the CVPIA.

Although Reclamation implemented AFRP flow objectives in the lower American River, temperature control problems still exist due to the relatively small coldwater pool available in Folsom Reservoir. To protect Central Valley spring-run Chinook salmon and steelhead, the 2002 BO on interim operations of the CVP and SWP specifies ramping criteria for releases from Nimbus Dam. The BO also requires Reclamation, to the extent possible, to control water temperatures in the lower American River between Nimbus Dam and the Watt Avenue Bridge (RM 9.4) from June 1 through November 30 to maintain a daily average temperature of less than or equal to 65 degrees Fahrenheit (°F) to protect juvenile steelhead from thermal stress and warmwater predator species. This BO resulted in a significant conflict for Folsom Dam operations due to the different life stages of these two targeted species at any given time. Also, the amount of cold water in Folsom Lake that could be released to meet temperature requirements for spawning and rearing of both fall-run Chinook salmon and steelhead is limited.

Currently, Reclamation receives recommendations from the interagency American River Operation Work Group (AROG) on seasonal fluctuations and ramping of stream flows in the lower American River. With input from AROG, Reclamation continues to adaptively manage lower American River temperatures through a combination of flow releases and intake shutter operations. The goal of this adaptive management is to

provide suitable temperatures during the summer months for the Nimbus Fish Hatchery and rearing juvenile steelhead, while minimizing the loss of the coldwater pool remaining for spawning fall-run Chinook salmon.

The 2004 OCAP BO by NOAA Fisheries indicates that the impacts of CVP and SWP operation on the American River would increase with the predicted increase in water demand. Recognizing that Reclamation is adaptively managing river temperature in coordination with NOAA Fisheries staff and AROG, the OCAP BO indicates additional protection of endangered and threatened species through coordination with the WFA for implementing associated water management actions to reduce future diversions from the American River and to provide supplemental flow with releases from upstream storage.

COORDINATION WITH ABFSHIP FOR POTENTIAL REGIONAL BENEFITS (OPPORTUNITY)

The ABFSHIP proposes to consolidate five existing NMWC diversions and one other diversion of local riparian water right holders on the Sacramento River into one or two new diversion facilities with fish screens. The WFA recommends the consolidation and screening of these diversions to benefit the environment and Sacramento River fisheries. PL 106-554 authorized a feasibility study for a Sacramento River diversion with facilities considered under both the SRWRS and ABFSHIP; however, these two studies have been developed as separate projects due to their different stages in the planning process.

The development of ABFSHIP is independent of SRWRS development. The opportunity for coordinating efforts of ABFSHIP and the SRWRS stems from potential reduction in overall environmental impacts that may be associated with having two major diversions in the less-than-2-mile reach of the Sacramento River, and increase in regional water management flexibility that may be realized through a collaborative approach in the urbanizing Natomas Basin. Local water purveyors (including NMWC and SRWRS cost-sharing partners) have been discussing issues of consolidating diversion needs for SRWRS cost-sharing partners and for NMWC's planned Elkhorn Diversion under the ABFSHIP Sankey/Elkhorn Diversions alternative, which is one of the three alternatives considered in the ABFSHIP environmental compliance process. As suggested in NMWC's 2000 ABFSHIP Feasibility Study Technical Report, the Sankey/Elkhorn Diversions alternative is the most feasible alternative and allows more flexibility in water management to fulfill NMWC's commitments for providing landscape irrigation water to the Sacramento International Airport, and facilitate required service to M&I purveyors in the Natomas Basin if the projected land use change from agriculture to urban occurs.

Implementation of the SRWRS is anticipated by local agencies, but implementation of ABFSHIP will rely on Federal and State funding from the AFSP and CALFED program. Despite progress in the environmental process, potential delay in full installment of Federal funding may result in staging or delay in construction of one or both ABFSHIP diversions, creating the opportunity of coordination between ABFSHIP and the SRWRS to maximize the potential regional benefits without impacting the schedule of improvements for fishery protection. While a preliminary protocol was developed for coordinating these two projects through a multi-agency coordination meeting,¹⁶ success in realizing this opportunity depends on the progress of the two projects and agreements among local water agencies.

¹⁶ Reclamation held this multi-agency coordination meeting on January 14, 2004. Participants include Reclamation, FWS, NOAA Fisheries, CALFED, CDFG, NMWC, and SRWRS cost-sharing partners. See Chapter 8 for detail.

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